IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICANT:	Avetik Harutyunyan et al.
APPLICATION NO.:	10/727,699
FILING DATE:	December 03, 2003
TITLE:	Systems and Methods for Production of Carbon Nanostructures
EXAMINER:	Edward M. Johnson
GROUP ART UNIT:	1754
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Dated: September 4, 2009 By: / Narinder Banait /

Narinder S. Banait, Reg. No. 43,482

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SUPPLEMENTAL REPLY BRIEF

This Reply Brief is filed in accordance with 37 CFR § 41.41 in response to the Supplemental Examiner's Answer, mailed on July 06, 2009.

The Examiner mailed a Supplemental Examiner's Answer on July 6, 2009. The Supplemental Examiner's Answer is identical to the earlier Examiner's Answer mailed on April 13, 2009, to which the Appellants filed a Reply Brief on June 12, 2009. The Examiner did not return the appellants' telephone calls requesting clarification.

The Appellants have not received any notification indicating that their Reply Brief, filed on June 12, 2009, was reviewed and entered. The Appellants respectfully requested that the June 12, 2009 Reply Brief be entered.

Respectfully submitted,

Avetik Harutyunyan

Dated: September 4, 2009

By: /Narinder Banait /

Narinder S. Banait
Registration No. 43,482
Fenwick & West LLP
801 California Street
Mountain View, CA 94041
Telephone: 650-335-7818
Facsimile: 650-938-5200
E-mail: nbanait@fenwick.com

Claims Appendix

1. A method for synthesizing carbon nanostructures, the method comprising:

providing a catalyst of metal nanoparticles, wherein the catalyst is supported on a powdered oxide substrate having a particle size of 0.5 μm to 5 μm;

entraining the catalyst in an inert gas; and

exposing the entrained catalyst to a carbon precursor gas at a temperature sufficient to form carbon nanostructures, wherein the carbon nanostructure is single-walled carbon nanotubes.

2. The method of claim 1, wherein the catalyst is a metal selected from the group consisting of iron, nickel, molybdenum and cobalt, or mixtures thereof.

3. The method of claim 2, wherein the metal is iron.

4. The method of claim 2, wherein the metal is molybdenum.

5. The method of claim 1, wherein the catalyst has a particle size between 3 nm to 7nm or about 5 nm to 10 nm.

7. The method of claim 6, wherein the powdered oxide substrate is selected from the group consisting of Al_2O_3, SiO_3, MgO and zeolites.

8. The method of claim 7, wherein the powdered oxide substrate is Al_2O_3.

10. The method of claim 1, wherein the inert gas is selected from the group consisting of argon, helium, nitrogen, or hydrogen.

11. The method of claim 10, wherein the inert gas is argon.

12. The method of claim 1, wherein the carbon precursor gas is selected from the group consisting of methane, ethane, propane, ethylene, propylene, and carbon dioxide.

13. The method of claim 12, wherein the carbon precursor gas is methane.

14. The method of claim 1, further comprising another gas.

15. The method of claim 14, wherein the other gas is selected from the group consisting of hydrogen, helium, argon, neon, krypton and xenon or a mixture thereof.

16. The method of claim 15, wherein the other gas is a mixture of hydrogen and argon.

17. The method of claim 1, wherein the temperature is less than 1000 ºC.

18. The method of claim 17, wherein the temperature is about 800 ºC to 1000 ºC.

38. A carbon nanotube structure produced by the process of :

entraining a catalyst in an inert gas, wherein the catalyst is a metal supported on a powdered oxide substrate, wherein the metal is selected from the group consisting of iron, nickel, molybdenum and cobalt, or mixtures thereof, and the powdered oxide substrate selected from the group consisting of Al_2O_3, SiO_3, MgO and zeolites;

exposing the entrained catalyst to a precursor gas at a temperature sufficient to form carbon nanotube structure; and

collecting the synthesized carbon nanostructures, wherein the carbon nanostructure is single-walled carbon nanotubes.

39. The process of claim 38, wherein the metal is iron.

40. The process of claim 38, wherein the metal is molybdenum.

41. The process of claim 38, wherein the powdered oxide substrate is Al_2O_3.

42. The process of claim 38, wherein the powdered oxide substrate has a particle size of 0.5 μm to 5 μm, and the metal has a particle size between 3 nm to 10 nm.

43. The process of claim 38, wherein the inert gas is selected from the group consisting of argon, helium, nitrogen, or hydrogen.

44. The process of claim 43, wherein the inert gas is argon.

45. The process of claim 38, wherein the reactant gas is selected from the group consisting of methane, ethane, propane, ethylene, propylene, and carbon dioxide.

46. The process of claim 45, wherein the reactant gas is methane.

47. The process of claim 45, further comprising another gas selected from the group consisting of hydrogen, helium, argon, neon, krypton and xenon or a mixture thereof.

48. The process of claim 47, wherein the other gas is a mixture of hydrogen and argon.

49. The process of claim 38, wherein the temperature is less than 1000 ^{o}C.